APPENDIX C

APPENDIX: C

TITLE: MEDICATION ASSISTED INTUBATION (M.A.I.) SUPPLEMENT

REVISED: April 29, 2011

MEDICATION ASSITED INTUBATION

I. BACKGROUND:

Also known as *Rapid Sequence Induction (RSI)*, *Rapid Sequence Intubation(RSI)*, *Crash Airway Procedures(CAP),*and other names*,* the use of medications to assist in intubation is both life saving and risky. The paramedic should be thoroughly familiar with ALL DRUGS DISCUSSED WITHIN THIS SECTION. Endotracheal intubation in this context, should only be initiated when it can be completed in a short period of time so as not to unduly delay provision of adequate ventilation.

It is understood that the general procedure for endotracheal intubation is well known by the paramedic. This protocol is to give the paramedic guidelines as to when pharmacological agents should be used as an adjunct for endotracheal intubation.

Pharmacological agents should be used to assist the paramedic in performing intubation in patients who are difficult to intubate due to excessive gag reflex in instances for which protecting the airway is a potential life-saving maneuver. Specific examples of circumstances in which such agents could be utilized are:

- Isolated head trauma
- Cerebrovascular accidents
- Multiple system trauma
- Overdose
- Status epilepticus
- Acute pulmonary edema
- Respiratory failure
- Severe burns
- And based on anticipated clinical course

The above indications are applicable when in those instances it is necessary to manage severe respiratory distress, optimize airway protection, hyperventilate for central nervous system lesions, or to provide ventilatory assistance in the presence of hypoventilation and hypoxia when other means of doing so are ineffective or contraindicated.

II. COMPLICATIONS:

The Paramedics must be prepared to deal with, and prevent complications while placing an Endotracheal tube. These include:

- airway trauma
- laryngeospasm
- hypoxia
- and aspiration

The worst-case scenario being a **"Can't Intubate, Can't Ventilate"** (CICV) situation. While there are many procedures endorsed in the medical community, common actions include:

- Alternating blade type and length
- Changing patient position
- Consider use of endotracheal tube introducer (AKA the "Bougie", Flexiguide)
- Attempting to ventilate with a BVM and basic airway adjuncts only.
- Attempting to place an alternative advanced airway (LMA, EOA, Combi-tube, etc)
- Needle cricothyrotomy
- Surgical cricothyrotomy
- Having another provider attempt intubation

APPENDIX

C

MEDICATION ASSITED INTUBATION

III. MEDICATIONS *(NOT ALL INCLUSIVE)*:

Sedative Hypnotics: To be used before depolarizing agents as an induction agent.

-Etomidate (Amidate): for adults and children greater than 2 years of age.

IV, IO: 0.2 – 0.4 mg/kg

Depolarizing Neuro-muscular Blocking Agents: To be used after Etomidate and/or Benzodiazepines.

- Succinylcholine Chloride (Anectine):

IV, **and IO**: 1-2 mg/kg, Repeat 1 time only.

PEDS: 1-2 mg/kg for children, 2 mg/kg for infants,

Non Depolarizing Neuro-muscular Blocking Agents: These are long acting paralytics to be used only after the ET is secured.

- **Vecuronium (Norcuron):** To be used only with estimated intubation times greater than 15-20 minutes, **on medical control order**. ONLY TO BE GIVEN AFTER TUBE IS CONFIRMED, AND SECURED.

ADULTS and PEDS: IV/IO 0.1mg/kg repeated PRN

Benzodiazepines (BZD): Versed is the preferred benzodiazepine in this setting.

-Midazolam (Versed)

IV, IO, IM: 0.5-5 mg, Max of 10mg

PEDS: 0.1-0.2 mg/kg IV/IO to a max of 5 mg/dose. Max of 10 mg

- Diazepam (Valium):

IV, IM, and IO: 5-10 mg. Repeat as needed up to max of 20 mg

PEDS: IV/IO: 0.2-0.3 mg/kg IV/IO PRN. Max of 20 mg

Opiates: Cautionary use with hypotension

-Morphine Sulfate (MS)

IV, IO, IM: 2-5 mg, repeat up to 20 mg as needed**.**

PEDS: IV/IM/IO: 0.2-0.3 mg/kg, repeated PRN every 5-10 min. Max of 15 mg.

-Fentanyl, (Sublimaze)

IV, IO, IM: 25-50 mcg. Max of 200 mcg.

PEDS: 2-5 mcg/kg. Max of 100 mcg

Other medications used in specific situations:

-Lidocaine (for suspected increased ICP, CVA, etc.):

IV, IO: 1 mg/kg

-Atropine for children > one month of age

IV, IO: 0.02 mg/kg. Minimum dose of 0.1 mg

APPENDIX C

MEDICATION ASSITED INTUBATION

IV. PROCEDURE:

PREPARATION:
Have the following ready:

- Bag-valve-mask connected to functioning oxygen delivery system
- Working suction with Yankauer suction tip attached
- Full Intubation set to include:
  - Endotracheal tube(s) with stylet, syringe and intact cuff and ETT Introducer.
  - Laryngoscope with blades and bright light source.
  - Scalpel
- Alternative airway (example: Combitube, if available and appropriate)
- Endotracheal tube introducer (AKA the "bougie", Flexiguide)
- Anticipated pharmacological agents
- Manpower
- Check to be sure that a functioning, secure vascular access device (IV or IO) is in place. Note: If unable to establish IV or IO access certain drugs may be given IM instead.
- Cardiac monitor. Be alert for the possibility of bradycardia or other dysrhythmias.

Assess the patient for likelihood of successful intubation and need for definitive airway, and the feasibility of alternative methods (Nasal ETT, BVM use only).

Ensure adequate oxygenation, with a BVM if required, while preparing the equipment

PRE-OXYGENATION AND MEDICATION:

Pre-medicate as appropriate and feasible:

- Atropine Sulfate for children > one month of age
- Lidocaine for intracranial pressure control in head injured patients, patients with CNS injury (hypertensive crisis, bleed, CVA), or for dysrhythmia control in patients at risk for ventricular dysrhythmias
- Benzodiazepines (Versed is preferred) as an option for sedation
- Opiates(Morphine is preferred) as an option for analgesia and further sedation

Oxygenate:

- Assist ventilations/oxygenate 2-3 minutes prior to *intubation attempt* unless patient's situation precludes this (inability to ventilate with BVM and inability to protect airway). Oxygenate as best as possible based on patient's condition using a BVM
- Good pre-oxygenation is a vital component to successful M.A.I. This ensures sustained oxygenation during the intubation attempt

Administer induction agent and/or paralytic 45-60 seconds prior to intubation:

- Etomidate
- Succinylcholine

APPENDIX

C

MEDICATION ASSITED INTUBATION

As patient relaxes:

- Apply cricoid pressure to occlude the esophagus **<u>until intubation is successfully completed, the endotracheal tube cuff is inflated, and tube position confirmed</u>**
- After fasciculations stop (if they occur), demonstrate adequate jaw relaxation by manipulating the mandible. Jaw relaxation and decreased resistance to bag-mask ventilations indicate that the cords are paralyzed and that it is time to proceed with intubation.

If inadequate relaxation is present, give either a:

- Second dose of Etomidate

  OR
- Initial or second dose of Succinylcholine Chloride

  OR
- Initial or second dose of Midazolam (or other benzodiazapine)

INTUBATION:

When adequate relaxation is obtained:

- Perform endotracheal intubation. If unable to intubate during the first attempt, stop and ventilate the patient with bag-mask for 30-60 seconds.
- If initial intubation attempts fail, consider
  - Alternating blade size and type
  - Changing patient position
  - Placing an alternative airway (EOA, EGTA, Combitube, LMA, etc)
  - Ventilating the patient with the bag-mask until spontaneous ventilation returns (usually six to ten minutes)
- If endotracheal intubation fails and you are unable to ventilate the patient with the bag-mask or use an alternative airway (i.e. the combitube) you should perform a needle or surgical cricothyrotomy. Paramedics utilizing Succinylcholine Chloride are required to be competent in needle and surgical cricothyrotomy (including Quicktrach)
- Treat bradycardia occurring during intubation by temporarily halting intubation attempts and hyperventilating the patient with the bag mask and 100% oxygen
- Once intubation is complete, inflate the cuff and confirm endotracheal tube placement by standard methods, **including ETCO2**.
- Release cricoid pressure, secure endotracheal tube with commercial device if available

<u>PEARL: Patient outcomes are directly related to the promptness and competency with which a paramedic moves through all appropriate options while maintaining ventilation</u>.

POST INTUBATION:
This shall apply not only to patients intubated by ACEMSS personnel, but any patient that has an advanced airway (i.e. Hospital/F.D. placed ETT, Combi-tube, LMA, PTLA) in place (with good control of the airway) who comes under the care of EMS personnel. **After any change in patient position or condition, reconfirm ET placement.**

- **Secure the Tube:** Using a commercial Tube Holder when available
- **Sedation: <u>continued sedation is mandatory and humane.</u>** The need for continued sedation is based on physiologic signs (biting the tube, attempts at respirations, and combativeness.) Inadequate sedation results in increased ICP, barotrauma, and poor compliance to ventilation. Sedation should be achieved using:
    - Benzodiazapines for sedation
    - Opiates as an option for analgesia secondary to ET placement, other injuries, and as an adjunct for further sedation
    - Other medications as ordered by medical control.
- **Restraints:** Restraints should be considered for the patient to prevent any dislodgement of the tube caused by any breakthrough combativeness
- **C-Collar**: Even in non-traumatic patients, the use of a C-Collar has been shown to reduce tube dislodgement. Therefore the C-Collar is strongly encouraged
- **ETCO2:** ETCO2 monitoring is mandatory (when available). Ventilate at rate/volume to maintain ETCO2 at 35-45 mm/hg. Ventilate as needed to ETCO2 of 30-35 mm/hg for obvious head injury with increased ICP
- **Removing the BVM:** Remove the BVM from the tube during patient transfer from cot to bed (and similar activities) to prevent the BVM from pulling the tube out
- **Troubleshooting:** Frequent reassessments for complications and dislodgements. "**Don't be a D.O.P.E**."
    - D: Displacement. Extubation or right main stem intubation
    - O: Obstruction: kinked ETT, vomitus, blood, mucus, etc.
    - P: Pneumothorax
    - E: Equipment Failure

V. REFERENCES:

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APPENDIX

C

MEDICATION ASSITED INTUBATION

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